

Unit 5 - Trigonometry

L1(7.1) Congruent & Similar Triangles

Definitions:

1. Ratio - a relationship between two quantities, usually expressed as a fraction.

2. Proportional - all ratios between corresponding sides are equal between two objects, and the ratio is called the scale factor.

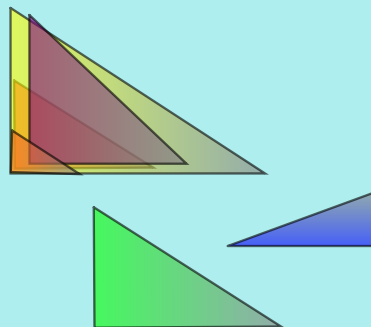
3. Congruent - two objects are congruent if they have the same dimensions and shape (the scale factor is 1)

Proven if : SSS, SAS (angle contained) or ASA (side contained)

4. Similar - objects are proportional, but not congruent (the scale factor is not 1)

Proven if: SSS~, SAS~ or AA~

Which shapes are congruent? proportional?



Parallel Line Theorems

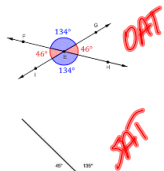
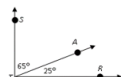
Z pattern	F pattern	C pattern
Alternate angles are equal	Corresponding angles are equal	Co-interior angles add to 180°

Remember....

SAT - **S**upplementary **A**ngle **T**heorem

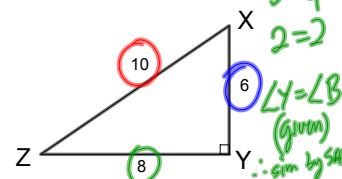
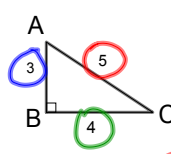
OAT - **O**pposite **A**ngle **T**heorem

CAT - **C**omplementary **A**ngle **T**heorem



Ex.1 Are the triangles congruent? Similar? Neither?

(a)



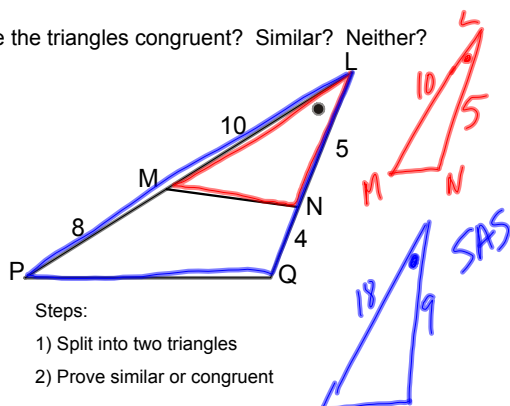
Congruent: proven if SSS or SAS or ASA

Similar: proven if SSS or SAS or AA~

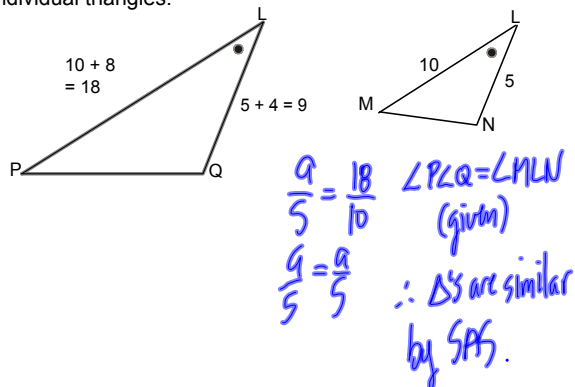
\therefore similar by SSS

$\frac{10}{5} = \frac{6}{3} = \frac{8}{4}$
 $2 = 2 = 2$
 Scale factor!

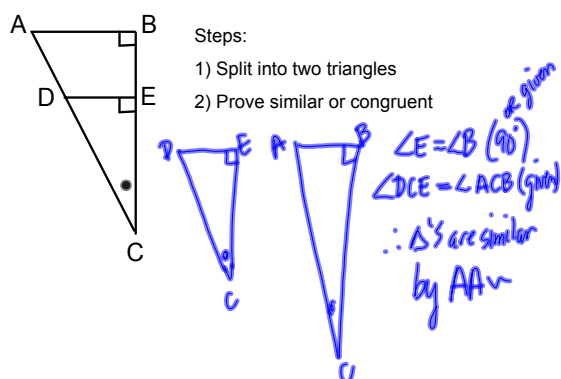
(b) Are the triangles congruent? Similar? Neither?



Recommend breaking overlapping triangles into individual triangles.



(c) Are the triangles congruent? Similar? Neither?



Summary:

If $\triangle ABC$ is similar to $\triangle XYZ$, we write:

$\triangle ABC \sim \triangle XYZ$

Similar

* the order that we write the vertices is important

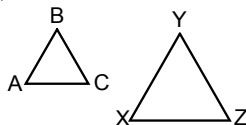
We can show similarity (or congruence) by:

- (a) side-side-side similarity (SSS~)
- (b) side-angle-side similarity (SAS~)
- (c) angle-angle similarity (AA~)

In similar triangles

- corresponding sides are proportional (i.e., the ratios are equal)
- corresponding angles are equal.

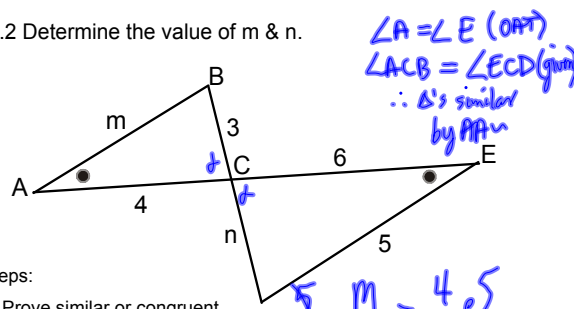
Given $\triangle ABC \sim \triangle XYZ$



$$\text{Sides: } \frac{AB}{XY} = \frac{BC}{YZ} = \frac{AC}{XZ}$$

$$\begin{aligned} \text{Angles: } & \angle A = \angle X \\ & \angle B = \angle Y \\ & \angle C = \angle Z \end{aligned}$$

Ex.2 Determine the value of m & n.



Steps:

- 1) Prove similar or congruent
- 2) Solve for unknown

$$\frac{n}{3} = \frac{6}{4}$$

$$n = \frac{18}{4}$$

$$n = \frac{9}{2}$$

$$n = 4.5$$

$$\frac{m}{5} = \frac{4}{6}$$

$$m = \frac{20}{6} = \frac{10}{3}$$

$$m = 3.3$$

Assigned Work:

Read p.374 - 378

Answer p.378 # 1, 2, 4ac, 5, 6, 7ab, 8cd, 13